

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

1-19-2019

ASSESSMENT OF CURRENT PRESERVATION STRATEGIES OF DIGITAL MATERIALS IN UNIVERSITY LIBRARIES IN SOUTH EAST, NIGERIA

Josiah Chukwumaobi Nworie

Alvan Ikoju federal college of education Owerri, Nigeria, chima.nworie@alvanikoku.edu.ng

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>

Part of the [Information Literacy Commons](#)

Nworie, Josiah Chukwumaobi, "ASSESSMENT OF CURRENT PRESERVATION STRATEGIES OF DIGITAL MATERIALS IN UNIVERSITY LIBRARIES IN SOUTH EAST, NIGERIA" (2019). *Library Philosophy and Practice (e-journal)*. 2272.

<https://digitalcommons.unl.edu/libphilprac/2272>

ASSESSMENT OF CURRENT PRESERVATION STRATEGIES OF DIGITAL MATERIALS IN UNIVERSITY LIBRARIES IN SOUTH EAST, NIGERIA

Abstract

This study assessed current preservation strategies of digital materials in university libraries in South East, Nigeria based on UNESCO Digital Preservation Guidelines. The study adopted a survey research method. The population was made up of 160 librarians in university libraries in South East, Nigeria. The instrument used for data collection was the questionnaire adapted from the UNESCO Digital Preservation Guidelines. Data were analysed, and simple percentages were used to answer the research questions and t-test was used to test the hypotheses. The study revealed that the librarians in the university libraries seem not to have knowledge of the UNESCO Digital Preservation Guidelines but fortunately, out of preservation instincts, the preservation strategies they adopted for their digital materials in the libraries were almost in line with the UNESCO Digital Preservation Guidelines. Moreover, there was no significant difference in the preservation strategies. The study recommends strongly that university librarians in South- East Nigeria should adopt the UNESCO Digital Preservation Guidelines as their working guide in preserving the digital materials in their libraries.

Keywords: Digital Materials, Digital Preservation, Strategies, UNESCO Digital Preservation guidelines, South East Nigeria

Introduction

Library is a place where anyone can create, access, utilize and share information, knowledge, enabling individuals, communities and people to achieve their full potentials in promoting sustainable development and improving quality of life (Akidi & Onyenachi 2017). It is a collection of books and non – book materials organized and housed in a place for use, with one or more persons trained to assist in the use of the collection (Nwaigwe & Onwuama, 2007). The holdings of libraries are the priceless heritage of mankind as they preserve facts, ideas, thoughts, accomplishments and evidences of human development in multifarious areas, ages and directions. The past records constitute a natural resource and are indispensable to the present and future generations; therefore, any loss to such materials is simply irreplaceable.

Library has continued to evolve over the years from the traditional closed access to the automated, electronic and digital open access libraries. Previously, library used to house mainly printed materials, but, in this era of ever evolving Information and Communication Technologies (ICTs), electronic and digital resources have become the central concern of librarians who want to adequately satisfy the library users. Libraries are migrating from the traditional setting to digital libraries.

Currently, most libraries are made up of both print and digital collections, services and infrastructure to support lifelong learning, research, scholarly communication as well as preservation and conservation of the recorded knowledge. The digital materials make up the digital libraries.

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2003), defined digital materials as resources of human knowledge or expression, whether cultural, educational, scientific and administrative or embracing technical, legal, medical and other kinds of information that are increasingly created digitally, or converted into digital form from existing analogue resources. These digital materials include texts, databases, still and moving images, audio, graphics, software and web pages among a wide and growing range of formats. In agreement with the UNESCO (2003), Iman, Adeyoyin, Jegede, and Adesanya, (2008) defined digital materials as all information resources in machine readable format such as compact discs read only memories (CD-ROMs), diskettes, flash drives, films, microfiche and allied accessories

such as computer software and hardware. Digital materials in libraries include websites and databases, chats, emails and correspondences that are generated digitally as well as analogue materials which are converted into digital formats through scanning. Digital materials are frequently ephemeral and require purposeful production, maintenance and management for retention. Moreso, one can say that digital library materials are information resources that exist in digital softwares and are carried by digital hardwares.

These digital materials are the bedrock upon which digital libraries thrive in the provision of information and recorded knowledge which management, lecturers and students of academic institutions need in running the affairs of the institutions. According to Aina (2004), the essence of library resources in the university is to ensure that the right user gets the right information materials at the right time, right format, right place and at the user's convenience. In higher education environment where researches and scholarship are paramount, the use of electronic resources is significant and the utilization of them is very much dependent on the users and purposes (Deng, 2009). Universities in Nigeria cannot thrive without information and libraries are to provide the right information in the right format to the right person that needs it and at the right time. Igbojesi (2003) opined that academic libraries are at the centre of tertiary education by supporting, enhancing and fostering learning as well as manpower development.

Michael (2006) posited that most of the digital library materials are not static due to constant change in digital and electronic technologies. Tried and tested products are soon replaced by smaller and faster media, sometimes with a life span of five years or less. Due to the sensitive nature of digital materials and the short time in which they are being replaced, reformatted and repackaged, they need to be properly taken care of, well managed and preserved. This is to ensure that the efforts and time used in acquiring, storing, processing, cataloguing, classifying and organizing them are not wasted.

There is now the practice of digitizing materials originally produced in non digital formats (print, film etc) to prevent permanent loss due to deterioration of the physical medium. The goal of digital preservation is to ensure the accurate rendering of authenticated content over time. Brown (2008) stated that, as a result of the deterioration of electronic and digital materials, preservation strategies are formulated in order to prevent their deterioration beginning from the creation stage.

In order to avoid losing the content, the medium, materials, time and resources used in creating and gathering such information, the data carriers/storage medium or media of such information are properly preserved because they are very sensitive, fragile and delicate. These data carrier / storage media include magnetic tapes (digital audio tapes -DAT), magnetic disks (floppy disks), optical disks like compact disks (CDs), video compact disks (VCDs), digital video disks (DVDs), hard disks and similar machine readable devices. Any little scratch, crack or break on the storage media can render the data perpetually invalid and inaccessible. Digital materials in the library should be well preserved and properly taken care of, to enhance continuity and avoid their deterioration. This is imperative because no digital library can function properly without the existence of these digital materials while the survival and continued usefulness of the digital materials depend on how well they are preserved.

Traditional preservation methods such as the legal deposit used by national libraries to ensure that certain number of copies of all printed materials published by authors in a country are kept in the library cannot be applied to digital materials for a variety of reasons. This is because web publications, often drawn on data stored on servers in different parts of the world, cannot be deposited in a particular nation. Moreover, web information placed on the web change very fast, even without the notification of anyone such that any information one gets on the web today can disappear tomorrow

For cultural institutions traditionally entrusted with collecting and preserving cultural heritage, the question has become extremely pressing as to which of these materials should be kept for future generations and how to go about selecting and preserving them. This enormous trove of digital information produced today in practically all areas of human activity and designed to be accessed on computers may well be lost unless specific techniques and strategies are developed to preserve it.

According to the UNESCO (2003) digital preservation guidelines, "Specific techniques and preservation strategies should be developed to preserve digital materials involving producers of digital information (including software) to include conservation as they design their products. Strategies for preserving digital materials should be adopted, which includes cooperation among libraries with similar intentions, refreshing, migration, emulation, and reproducing (back up)

documents in the digital formats as often as possible, allocating responsibility to skilled staff, offsite storage for back up, establishing a data refresh regime suited to the life of the media, engaging the third party service providers for the protection of webpages against virus attacks and the use of antiviruses, employing the non digital approach by printing out some vital documents.

Today in Nigeria, digital and electronic libraries are being set up in various university libraries and co-exist with traditional libraries to provide information services side by side. According to Chukwuma (2004) and Alegbeleye (2008), librarians are managers of libraries and are expected to take proper care of the resources in the libraries including the digital materials under good condition. Most libraries in Nigeria may run the risk of losing their digital material contents if proper preservation steps are not taken which hinges on right preservation strategies. The UNESCO Charter (2003) on the preservation of digital materials is a proper guideline for sound preservation of digital materials in the library. It is based on this backdrop that this study on the assessment of current preservation strategies of digital materials in university libraries in South-East, Nigeria was conceived.

Problem Statement

Digital materials, unlike the texts of print media, are subject to inadvertent destruction of the physical medium on which they exist and the information that are contained in them. Electronic texts are so easy to edit, manipulate, revise and improve and can lose their assurance of permanence especially if they are not properly locked or cared for. Alegbeleye (2008) called this fragility of the media. Many types of accidental changes may occur. A document may be damaged accidentally or as a result of the nature of the electronic resource.

Moreover, the problem of technological obsolescence is inevitable. Digital media have continued to evolve over the years. The equipment to use them change from time to time thereby creating problems in retrieving the information content. For example, there have been transitions of digital storage devices from 8-inch floppy disks to 5.25-inch floppies, to 3-inch diskettes, to flash drives, CDs, CD-ROMs, VCDs, DVDs, external hard disks among others. These storage devices become obsolete very quickly and today it is very difficult to find one drive for all storage devices. Additionally, there is the problem of inconsistency in the existing preservation strategies

of many institutions. A study by Atanda (2017) discovered that libraries in Nigeria are faced with the major challenge of lack of consistent strategies in the preservation of their digital materials.

Digital libraries are being set up in university libraries in Nigeria today and most of them hoist their information in various websites, servers, hard disks and other storage media. If proper preservation guidance and care are not taken, any disaster can wipe out the entire works and the library will be left with little or nothing. The problem of this study therefore is that university libraries in this digital era may not be able to meet their primary objective of providing the information needs of their users in digital formats if digital preservation strategies are not taken seriously. In order to keep digital materials in the library accessible and usable, there is need for university librarians to apply the preservation guidelines as stated by UNESCO (2003).

Objective of the Study

Specifically, the study assessed:

The preservation strategies being implemented for digital materials in university libraries in South-East, Nigeria based on UNESCO (2003) Digital Preservation Guidelines

Research Question

What are the preservation strategies being implemented for digital materials in university libraries in South-East, Nigeria based on UNESCO (2003) Digital Preservation Guidelines?

Null Hypothesis

The preservation strategies implemented for digital materials by the university librarians in South-East, Nigeria based on UNESCO Digital Preservation Guidelines do not differ significantly based on the university ownership.

Review of Related Literature

Digital materials in the library are collected, managed and disseminated for scholarship so as to assist and provide useful information for the communities or institutions that established it. Collecting the digital materials is the first step in building a digital library, and this can be done in different ways. How digital materials are collected may affect the quality as well as the ability

to preserve them. It is important to know how digital materials in the library are collected, and how quality is ensured; this is imperative because different levels of preservation efforts will be dependent on both the initial quality of the content and its format.

In preserving digital materials in the library, certain strategies are being put into consideration. UNESCO (2003), in adopting strategies for preserving digital heritage stated that, Strategies and policies to preserve the digital heritage can be developed, taking into account the level of urgency, local circumstances, available means and future projections. The cooperation of creators, holders of copyright and related rights, and relevant institutions in setting common standards and compatibilities, and resource sharing, will facilitate this.

The preservation strategies stated by UNESCO in their charter (2003), for preservation of digital materials in data carriers/ storage media are:

- a. Let the institution, government, organization, individual etc decide on the format that will be accepted for preservation. If possibly, negotiate with producers to use widely accepted standards and to provide adequate documentation
- b. Store media / data carriers in appropriate conditions
- c. Copy data to more stable media and make back up copies, using good quality media
- d. Store data securely, including offsite storage for backup if possible
- e. Check data for errors regularly
- f. Establish a data refresh regime suited to the life of the media
- g. Record information that will be needed to provide short term access – the identity of the material, access requirements, passwords etc
- h. Retain necessary access equipment and software, maintaining hardware and protecting software within license arrangements
- i. Plan to pass the digital materials to another suitable care taker, that is, liaising with other institutions who have similar interest or responsibilities or experience in preserving or

managing the kind of materials that you are interested in and seek guidance and mentoring

- j. Alternatively, find ways to adequately reflect the material in a stable non digital form (such as printing out).

For data on web pages (websites, online databases, emails, correspondences, web blogs, etc), these are the guidelines noted by UNESCO (2003).

- a. Allocate responsibility to a skilled and trained staff to manage the data
- b. Protect data by using third party service providers to continue to maintain access online
- c. Plan to continue to provide access to users incase the service providers services are no longer available
- d. Copy data out to a more secure storage media for adequate back up
- e. Transfer data to a new or refreshed carrier without loss.

According to Rosenthal, Robertson, Lipkis, Reich, and Morabito (2005), there are strategies, system designers can employ to survive threats to digital library contents. Nonetheless, Brown (2008) stated criteria any data creator should consider when selecting removal storage media in the library. They include: **Longevity** (the media storage chosen should have a proven life span of 10years. Longevity greater than this, however, is not necessarily an advantage because over longer timescales, obsolescence of the drive technology used to read the medium will typically be a much more significant factor than physical deterioration of the storage medium itself), **Capacity** (the media storage option chosen should provide a storage capacity appropriate for the quantity of data to be stored and the physical size of the storage facilities available. Minimizing the number of actual media to be managed will generally be more efficient and cost effective), **Viability** (the media storage chosen should support robust error-detection methods for both reading and writing data. Provision for testing the integrity of media after writing is also a benefit.

Proven data recovery techniques should also be available in case of data loss. Media should be write-once, or have a reliable write-protect mechanism to prevent accidental erasure and maintain the evidential integrity of the data), **Obsolescence** (The media and its supporting hardware and software should preferably be based on mature, rather than leading – edge technology. The technology should be well established in the market place and widely available. Media technologies that are based upon open standards for both media and drives are generally preferably to those that are proprietary to a single manufacturer), **Cost** (Two elements must be considered when assessing the relative costs of storage media- the costs of the media itself and the total cost of ownership. Valid comparisons of media costs must always be made on a price per gigabyte (GB) basis. The total cost of ownership will include costs for purchasing and maintaining the necessary hardware and software, and of any storage equipment required. Support costs and the quoted mean time before failure of the relevant drive must also be taken into account), and **Susceptibility** (the media should have low susceptibility to physical damage and be tolerant of a wide range of environmental conditions without data loss. Magnetic media should have a high coercivity value (preferably in excess of 1000 Oersteds – Oersteds are the unit of measurement for magnetic field intensity), in order to minimize the chances of accidental erasure through exposure to magnetic fields. Any measures required to counter known susceptibilities (such as packaging or storage requirements) should be affordable and achievable).

Other measures to be taken by any library in preserving her digital collections as stated by UNESCO (2003), supported by Rosenthal, Robertson, Lipkis, Reich, and Morabito (2005), Tiwari (2008) and emphasized by Yuan Li and Meghan (2011) include:

- Placing the digital materials in a safe place like in racks, vaults, shelves etc
- Using structured metadata and other documentation to facilitate access
- Protecting the integrity and identity of data
- Choosing appropriate means of providing access in the face of technological change by refreshing the documents in the hardware, migration, replication, emulation, transparency,

diversity which includes sharing of resources and forming of consortium with other academic institutions, audit, sloth etc.

- management preservation programmes be put in place to achieve their goals in cost effective, timely, holistic, proactive and accountable ways.

These strategies as strongly believed by Rosenthal et al (2005), if they are properly put in place, will enable digital materials in the library to survive threats that attack system's contents.

Furthermore, Gbaje (2011) carried out a study titled, "*Digital preservation strategies: a case study of Nigerian national information centre*", the purpose was to find out the digital preservation strategies and structures put in place for the implementation of the strategies adopted. A case study and qualitative methodology were adopted. Data were obtained through semi-structured questionnaire from fifteen (15) staff who were incharge of digitization and digital preservation units of three centres studied. From the findings of the study, migration among others was the most popular digital preservation strategy adopted and no structure was put in place to assess digital objects for preservation action.

Methodology

The design adopted for this study was descriptive survey design. According to Akuezuilo and Agu (2007), descriptive survey describes and interprets what is; it seeks to find out the conditions or relationships that exists, opinions that are held, processes that are going on, effects that are evident, or trends that are developing. According to Gall, Gall and Borg (2007), a survey is a method of data collection using questionnaire or interviews to collect data from a sample that has been selected to represent a population to which the findings of the data analysis can be generalized. The survey design enables the researcher to explore the current status of a phenomenon and does not involve manipulation of variables. It was suitable for this study because it involved the use of questionnaire to collect data from a well defined population on existing practices.

The population of the study was made up of 160 librarians in the 10 university libraries in South East, Nigeria. The 10 university libraries in the zone are University of Nigeria Nsukka (UNN) Library, Nnamdi Azikiwe University Awka (NAU) Library, Federal University of Technology Owerri (FUTO) Library, Michael Okpara University of Agriculture Umudike (MOUUAU) Library, Federal University Ndufu - Alike (FUNAI) Library, Enugu State University of Science and Technology (ESUST) Library, Anambra State University Uli (ANSU) Library, Imo State University Owerri (IMSU) Library, Abia State University Uturu (ABSU) Library, and Ebonyi State University Abakiliki (EBSU) Library. All the population of the study was used and for this, no sample was drawn for the study. Data were collected through a structured questionnaire. The questionnaire was adapted from the UNESCO (2003) Guidelines for Digital Preservation in line with the objectives of the study. In order to determine the reliability of the instrument for data collection, a pre-test was conducted using Kuder-Richardson formula 20. The reliability coefficient of .84 was obtained, which was of high reliability. Data collected were analyzed using the descriptive and inferential statistics. Specifically, the research questions were presented in tables and answered with the use of percentages, while t-test was used to test the hypotheses at 0.05 level of significance.

Data Analysis and interpretation of Results

Research Question: What are the preservation strategies being implemented for digital materials in university libraries in South-East, Nigeria based on the UNESCO Digital Preservation Guidelines?

Data meant to provide answer to this research question were collected and presented in Table 1.

Table 1

Responses on Preservation Strategies being implemented for Digital Materials in University Libraries in South-East Nigeria based on the UNESCO Digital Preservation Guidelines

S/N	Preservation Strategies of Digital materials	Yes (Percentage/%)	No (Percentage/%)	Total (Percentage/%)
1	Deciding on the formats that will be accepted for preservation, possibly by negotiating with producers to use widely accepted standards & file formats, and providing adequate documentation	77 (68.1)	36 (31.9)	113 (100)
2	Storing media in appropriate conditions	104 (92.0)	9 (8.0)	113 (100)
3	Copying data to more stable media and making back up copies by using good quality media	103 (91.2)	10 (8.8)	113 (100)
4	Storing data securely, including offsite storage for back ups if possible	105 (92.9)	8 (7.1)	113 (100)
5	Checking data for errors regularly	84 (74.3)	29 (25.7)	113 (100)
6	Establishing a data refresh regime suited to the life of the media	71 (62.8)	42 (37.2)	113 (100)
7	Recording information that will be needed to provide short term access-the identity of the materials, access requirement, password etc	101 (89.4)	12 (10.6)	113 (100)
8	Retaining necessary access equipment and software, i.e maintaining hardware, and protecting software with license arrangements	86 (76.1)	27 (23.9)	113 (100)
9	Liaising with other libraries who have similar interest or experience in preserving the kind of materials that you are interested in and seeking their guidance and mentoring	63 (55.8)	50 (44.2)	113 (100)
10	Having a disaster plan by alternatively finding ways to adequately reflect the material in a stable non digital form (such as printing out).	76 (67.3)	37 (32.7)	113 (100)
11	Allocating responsibility to a skilled and trained staff to manage the data	106 (93.8)	7 (6.2)	113 (100)
12	Protecting data by using third party service providers to maintain access online such as subscription to antiviruses	98 (86.7)	15 (13.3)	113 (100)
13	Having plans to continue to provide access to users in case the service providers are discontinued	101 (89.4)	12 (10.6)	113 (100)
14	Copying out data to a more secure storage media for adequate back up	96 (85.0)	17 (15.0)	113 (100)
15	Transferring data to new or refreshed carriers without loss	78 (69.0)	35 (31.0)	113 (100)

The result in the Table 1 shows percentages of librarians that attested to the preservation strategies that were being implemented in preserving their digital materials in the university libraries in South-East Nigeria based on UNESCO digital preservation guidelines. The result showed that 93.8 percent of the librarians agreed that they allocate responsibility to skilled and trained staff to manage their data, followed by 92.9 percent who agreed that they store their data securely even to offsite locations for back up purposes. 92 percent of the librarians responded that they store their media in appropriate conditions; 91.2 percent agreed that they copy their data to more stable and good quality media and make backup copies as well. Moreover, 86.7 percent agreed that they protect their data by using third party service providers to maintain access online such as subscription for antiviruses. However, 55.8 percent of the librarians agreed that they liaise with other libraries that have similar interest or experience in preserving their digital materials. Although the librarians do not have the UNESCO (2003) digital preservation guidelines, their digital materials preservation strategies are closely in line with that.

Null Hypothesis

The preservation strategies implemented for digital materials by the librarians in university libraries in South-East, Nigeria based on UNESCO Digital Preservation Guidelines do not differ significantly based on the University ownership.

Data were collected in respect to this hypothesis and subjected to statistical test. The result is presented in Table 2.

Table 2: Test of difference in the Preservation Strategies Implemented for Digital Materials by Librarians in the University Libraries in South-East Nigeria based on the UNESCO digital Preservation Guidelines (N = 113, State = 28, Federal = 85, df = 111).

S/N	Preservation Practice	University ownership	Mean	Std. Deviation	t-cal.	Sig. (2-tailed)	Decision
16	Deciding on the formats that will be accepted for preservation, possibly by negotiating with producers to use widely accepted standards & file formats, and providing adequate documentation	State	1.4286	.50395	1.441	.152	NS
		Federal	1.2824	.45282			
17	Storing media in appropriate conditions	State	1.1071	.31497	.615	.540	NS
		Federal	1.0706	.25766			
18	Copying data to more stable media and making back up copies by using good quality media	State	1.1786	.39002	1.950	.054	NS
		Federal	1.0588	.23669			
19	Storing data securely, including offsite storage for back ups if possible	State	1.0714	.26227	.015	.988	NS
		Federal	1.0706	.25766			
20	Checking data for errors regularly	State	1.2143	.41786	-.587	.558	NS
		Federal	1.2706	.44690			
21	Establishing a data refresh regime suited to the life of the media	State	1.2857	.46004	-1.081	.282	NS
		Federal	1.4000	.49281			
22	Recording information that will be needed to provide short term access-the identity of the materials, access requirement, password etc	State	1.1071	.31497	.019	.985	NS
		Federal	1.1059	.30951			
23	Retaining necessary access equipment and software, i.e maintaining hardware, and protecting software with license arrangements	State	1.1429	.35635	-1.374	.172	NS
		Federal	1.2706	.44690			
24	Liaising with other libraries who have similar interest or experience in preserving the kind of materials that you are interested in and seeking their guidance and mentoring	State	1.3571	.48795	-1.044	.299	NS
		Federal	1.4706	.50210			

NS- Not Significant @ t-cal < 1.96 and S- Significant @ t-cal > 1.96

Table 2 revealed that there is no significant difference in all the preservation strategies being implemented for digital materials by librarians in the state and federal university libraries in South-East Nigeria based on the UNESCO digital preservation guidelines.

This study on preservation strategies of digital materials currently being implemented in the library revealed that 93.8% of the university librarians in South-East, Nigeria agreed that they allocate responsibility of the preservation of their digital materials to skilled and trained staff to manage the data. A total of 92.9% agreed that they store their data securely including offsite storage for backups. 92.0% were positive that they store their media in appropriate condition by placing them on racks, shelves, good cover and under good environment. A total of 91.2% of the librarians in university libraries in South-East, Nigeria also agreed that they refresh and migrate their digital materials by copying data to more stable media and making backup copies by using good quality media. This corroborates UNESCO (2003) Digital Preservation Practices and Guidelines that says important information contained on digital materials like databases, websites, CDs, CD-ROMs, DVDs, Hard disk etc should be properly preserved by placing the digital materials in a safe place like racks, vaults, shelves etc, protecting the integrity and identity of data through migration, refreshing, encapsulation, emulation and assigning the preservation programme to a competent and skilled staff etc.

This finding therefore shows that the librarians in university libraries in South-East, Nigeria are on course with the UNESCO Digital Preservation Guidelines on digital preservation practices notwithstanding that the librarians did not have any knowledge of UNESCO Digital Preservation Guidelines but by preservation instinct, thereby, keeping their digital materials where they cannot be destroyed. The finding also supports Yuan Li and Meghan (2011) who found out that Academic and Research libraries in Massachusetts USA back up and secure their Institutional Repositories (IRs) contents which are parts of digital libraries in secure storage system as part of their preservation strategies.

This study also revealed that there is no significant difference in all the preservation strategies of digital materials adopted by librarians in the state and federal university libraries in South-East, Nigeria based on the UNESCO Digital Preservation Guidelines. This implies that librarians from

the state and federal university libraries in South-East, Nigeria adopted to a considerable extent some preservation strategies without a prior knowledge as stipulated by UNESCO (2003) Digital Preservation Guidelines in preserving their digital materials.

Another finding of this study revealed that 55.8% of the librarians in university libraries in South-East, Nigeria do not liaise with other libraries that have similar interest or experience in preserving the kind of digital materials they are interested in. This shows that university libraries in South-East, Nigeria do not cooperate in preserving their digital materials; librarians in each library are more interested in managing their own digital materials. This finding of the study is not in line with the UNESCO (2003) Digital Preservation Guidelines which states that libraries with similar interest should form consortium in seeking guidance and mentoring.

Summary of Major Findings

From the results of the analysis, the following findings were made:

1. Preservation strategies being implemented for digital materials by librarians in the university libraries in South-East, Nigeria were seemingly in line with the UNESCO (2003) Digital Preservation Guidelines.
2. There was no significant difference in all the preservation strategies of digital materials adopted by librarians in the state and federal university libraries in South-East, Nigeria and the UNESCO Digital Preservation Guidelines.

Conclusions

Based on the findings of this study, the following conclusion is drawn:

That the preservation strategies librarians in the university libraries in South East, Nigeria implement in preserving their digital materials are in line with the UNESCO (2003) Digital Preservation Guidelines. The preservation strategies currently being implemented were by preservation instincts, and are fortunately in line with the UNESCO Digital Preservation Guidelines. It should be noted that proper preservation of digital materials in the library should only be based on the UNESCO Digital Preservation Guidelines which is a positive attitude and a way forward in the future development of digital libraries in Nigeria.

Recommendation

Based on the findings of this study, the following recommendations are made:

Management of university libraries in South-East, Nigeria should make available necessary infrastructure and facilities for the preservation of digital materials in the library. These facilities should be upgraded and updated as and when due. This will foster access and prevent bit-rot of digital materials in the library. Moreso, the university libraries should liaise or form a consortium with other university libraries in preserving their digital materials as strongly recommended by the UNESCO Digital Preservation Guidelines. This will enable the librarians to share vital information that will enable them improve on their digital preservation programmes.

References

- Aina, L.O. (2004). *Library and information science text for Africa*, Ibadan: Sam-adex printers.
- Akande, S.O. (2010). *Influence of knowledge and perception on personal attitude towards preservation of information resources in federal university libraries in Nigeria*. (PhD Thesis) submitted to the Faculty of Education, Department of Library, Archival and Information Studies, University of Ibadan, Nigeria.
- Akidi, J.O. & Onyenachi, J.C. (2017). Bridging the digital divide: the potential role of the national library of Nigeria. *Nigerian Libraries: Journal of the Nigerian Library Association*, 50(1)
- Akuezuilo, E.O. & Agu, N. (2007). *Research and statistics in education and social sciences: methods and applications*. Awka: Nuel Centi
- Alam, A.M. (2003). Digital Libraries: needs, technology and benefits, *ILA bulletin*; 38(3), 22-26
- Alegbeleye, B. (1993). *Disaster control planning for libraries, archives and electronic data processing centres in Africa*. Ibadan: Options books & Information Services.
- Alegbeleye, B. (1996). A study of book deterioration at the university of Ibadan, library and its implications for preservation and conservation in Africa, *Journal of library, archival and information science*.6(1), 37-45
- Alegbeleye, G.O. (2006). *Research methods in education*. Ibadan: University press.
- Alegbeleye, B. (2006, September). Effects of information technology on the management of Libraries. *AGOL*. Retrieved from <http://www.AGOL.org>
- Alegbeleye, B. (2008). Past imperfect, present continuous, future perfect: the challenges of preserving recorded information in Nigeria. *Inaugural lecture delivered at the university of Ibadan*. Ibadan: Ibadan University press.
- Atanda, S.S. (2017). Digital preservation challenges in Nigeria libraries: awareness of challenges of digital preservation in Nigeria libraries – librarians perspective. *Interdisciplinary digital preservation tools and technologies*. 13. doi: 10.4018/979-1-5225-1653-8.ch003
- Chukwuma, O. (2004). *Use of library for knowledge & research*. Enugu: Sound and sense

limited

- Deng, H. (2009). An empirical analysis of the utilization of university digital library resources. *Interdisciplinary digital preservation tools and technologies*. Retrieved from www.igi-global.com/chapter/empirical-analysis-utilization-university-digital/19898?camid=4VI
- Digital Preservation Coalition (2008). *Introduction: definitions and concepts: digital preservation handbook*. York, UK. Retrieved on February 24, 2012 from www.dpconline.org//graphics/handbook/index.html
- Emojorho, D. (2012). An Appraisal of digital reference services in Nigerian university libraries: *An International Journal of Information and Communication Technology (ICT)*, 9(2) 1 – 7
- Gall, M.D., Gall, J.P., & Borg, W.R. (Eds). (2007). *Educational research: An introduction*. Boston: Pearson
- Gbaje, E.S. (2011). Digital preservation strategies: a case study of Nigerian national information centres. *Sage journals*, 37(3).
<http://journals.sagepub.com/doi/abs/10.1177/0340035211418727>
- Igboejesi, A.C. (2003). *Management of audio – visual resources in academic libraries in the South – East Nigeria*: (Unpublished MLS thesis). Imo State University Owerri, Imo State
- Iman, A., Adeyoyin, S.O., Jegede, O.R. & Adesanya, O. (2008). *Library and information: an introductory text for students in tertiary institutions*. Abeokuta: Eagle publishers
- Michael, D. (2006). *The long term preservation of web content, web archiving*. Berlin: Springer. pp 177 – 199
- Ngulube, P.C. (2005). Environmental monitoring and control at national archives and libraries in Eastern and Southern Africa. *Libri55*:154-168.
- Nwaigwe, U.C. & Onwuama, M.E. (Eds.) (2007). *Effective guide to the use of library for higher education*. Owerri: Cel-Beb & Company Publishers
- Patten, M.L. (2005). *Understanding research methods: An overview of the essentials*. (5thed). California: Pyrczak Publishing
- Reitz, J.M (2004). *Dictionary for Library and Information Science*. America: Libraries Unlimited
- Sambo, A. S., & Saturday, U. (2014). Awareness of digital preservation strategies by librarians in Nigeria. *International journal of information research*. 4(1). Retrieved on April 26, 2015 from <http://www.spoars.org/journal/v3n4p6>
- UNESCO. (2003). *Guidelines for the preservation of digital heritage*. UNESCO: Information society division. Retrieved on April 13, 2013 from www.unesco.org/webworld/mdm
- Tiwari, P. (2008). *Digital library*. New Delhi: APH Publishing Corporation
- Wikipedia (2014, January 6). *Electronic media*. Retrieved from <http://www.wikipedia.com>
- Wikipedia (2014, March 15). *Digital library*. Retrieved from <http://liswiki.org/wiki/digitallibrary>
- Wikipedia (2015, April 20). *UNESCO*. Retrieved from <http://en.wikipedia.org/wiki/UNESCO>
- Yuani, L. & Meghan, B. (2011). Institutional repositories and digital preservation: assessing current practices at research libraries. *D-Lib Magazine*. Retrieved on May 11, 2013 from www.dlib.org/dlib/may11/yuanli/05yuanli.html